Parametric Study of a Corona Discharge at Atmospheric Pressure

Driss Raouti[1], Samir Flazi[2], Djilali Benyoucef[3], Azzedine Mokadem[4]

[1] Université de Saida, Faculté des Sciences et de Technologie, Département d'Electrotechnique, BP 138 Cité ENNASR Saida, Algérie

[2] Département d'Electrotechnique, Faculté des Sciences et de Technologie, Université d'USTOMB Oran, BP 1505 El-M'Naouar Oran, Algérie,

[3] Laboratoire Génie Electrique et Energies Renouvelables, Chlef university, Algeria,

[4] Centre de Recherche en Technologie des Semi-conducteurs pour l'Energétique (CRTSE)-Division n°2, Bd. Dr. Frantz FANON-p.o.box 140 Alger sept merveilles-16038-ALGERIA.

E-mail: raouti1@yahoo.fr

Abstract:

An equivalent electrical model proposed and validated in a previous work [1], represents the positive point to plane discharge, by a variable resistor in series with a variable capacitance. Based on the proposed model, we present in this paper, a parametric study examining the influence of the two operating parameters, applied voltage and distance between electrodes on both electrical parameters of the equivalent model during the passage of the discharge.

Regardless of the details in this abstract, it was found that, in general, all of these effects are brought by a common factor which is the resultant electric field expressed by the relationship $E=V/d$ [2, 3]. This determines the strength of the first streamer, the possibility of creating and developing a second streamer as well as its strength and consequently, the amount of total charges produced what characterizes the aspect of the electrical parameters of the discharge and behavior discharge in general term.

This study showed that in particular the resistance of the discharge before the outbreak of the discharge pulse, obeyed the law of Paschen [4], this is very important because it determines the lowest level of the applied voltage that provides the lowest resistance value to get a discharge.

References:

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